National Institute of Environmental Health Sciences

History of equatorial vegetation fires and fire research in Southeast Asia before the 1997-98 episode: A reconstruction of creeping environmental changes

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Abstract:

Charcoal fragments in forest soils give evidence of prehistoric and historic natural and anthropogenic wildfires in the equatorial rainforests and in seasonal monsoon forests of continental and insular South Asia. Conditions favourable for the occurrence of historic and contemporary rainforest fires are associated with droughts, especially during dry spells caused by the El Niño-Southern Oscillation (ENSO) event. Historic land-use fires and wildfires can be reconstructed from a number of narrative reports, including documents that reveal drought and famine. In the eastern part of Borneo prehistoric and historic records of coal fires reveal a unique natural source of wildfires. Starting with modern transmigration programs and systematic conversion of primary and secondary vegetation, including peat-swamp ecosystems, into farmland and industrial plantations, the use of fire as a land-clearing tool escalated in the 1990s. During droughts land-clearing fires additionally contribute to wildfires. A detailed study of the ecological consequences of the episode of land-use fires and wildfires of 1982-1983 was conducted on an area of 2.7 million ha of dipterocarp rainforest in East Kalimantan. The results show that dipterocarps are highly susceptible to fire and are replaced by pioneers and fire-tolerant species that occupy the disturbed sites or survive the immediate fire effects. Smoke from forest conversion burning caused considerable environmental problems, reducing visibility and affecting human health and security. Emissions from vegetation burning influence chemistry and functioning of the global atmosphere. The situation is different in those parts of mainland and insular Southeast Asia that are characterized by seasonal climate. Through long-term influence of climate variability, fire influence, and anthropogenic pressure the vegetation is better adapted to extrinsic stresses. During the 15 years between the extreme ENSO events and fire episodes of 1982-1983 and 1997-1998 the national and international communities have been alerted and prepared to respond to the escalating fire situation in Indonesia. The response to the onset of the 1997-1998 fire and smoke episode, however, was absolutely inadequate and erratic. Meanwhile a whole continent - the maritime continent of Southeast Asia - has been degraded by excessive fire application for more than 20 years. © 2007 Springer Science+Business Media, B.V.

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Resource Description

Exposure :

weather or climate related pathway by which climate change affects health

Ecosystem Changes, El Nino Southern Oscillation, Extreme Weather Event

Extreme Weather Event: Wildfires

Geographic Feature: ☑

resource focuses on specific type of geography

Tropical, Other Geographical Feature

Other Geographical Feature : rainforest

Geographic Location: ☑

resource focuses on specific location

Non-United States

Non-United States: Asia

Asian Region/Country: Other Asian Region

Other Asian Region: Southeast Asia

Health Impact: ☑

specification of health effect or disease related to climate change exposure

Health Outcome Unspecified

Resource Type: ☑

format or standard characteristic of resource

Review

Timescale: ☑

time period studied

Time Scale Unspecified

Vulnerability/Impact Assessment: ☑

resource focus on process of identifying, quantifying, and prioritizing vulnerabilities in a system

A focus of content